

ConfigurationDesk/RTI

Compatibility with Toolboxes and Blocksets Provided by MathWorks

Version 1.0 – October 2017

How to Contact dSPACE

Mail: dSPACE GmbH
Rathenaustraße 26
33102 Paderborn
Germany

Tel.: ++49 5251 1638-0

Fax: ++49 5251 16198-0

E-mail: info@dspace.de

Web: <http://www.dspace.com>

How to Contact dSPACE Support

To contact dSPACE if you have problems and questions, fill out the support request form provided on the website at <http://www.dspace.com/go/supportrequest>.

The request form helps the support team handle your difficulties quickly and efficiently.

In urgent cases contact dSPACE via phone: +49 5251 1638-941 (General Technical Support)

Software Updates and Patches

dSPACE strongly recommends that you download and install the most recent patches for your current dSPACE installation. Visit <http://www.dspace.de/goto?support> for software updates and patches.

Important Notice

This document contains proprietary information that is protected by copyright. All rights are reserved. The document may be printed for personal or internal use provided all the proprietary markings are retained on all printed copies. In all other cases, the document must not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent

© 2017 by:

dSPACE GmbH
Rathenaustraße 26
33102 Paderborn
Germany

This publication and the contents hereof are subject to change without notice.

CalDesk, ConfigurationDesk, ControlDesk, MicroLabBox, SCALEXIO, SYNECT, SystemDesk, and TargetLink are registered trademarks of dSPACE GmbH in the United States or other countries, or both. Other brand names or product names are trademarks or registered trademarks of their respective companies or organizations.

Contents

Introduction	5
Overview	7
Supported Blocksets with Known Issues	8
<i>Parallel Computing Toolbox / MATLAB Distributed Computing Server ...</i>	<i>8</i>
<i>DSP System Toolbox</i>	<i>8</i>
<i>Simscape, Simscape Electronics, Simscape Driveline, Simscape Fluids and Simscape Multibody</i>	<i>9</i>
<i>Simscape Power Systems</i>	<i>12</i>
<i>Stateflow</i>	<i>14</i>

Introduction

The compatibility information in this document covers dSPACE Release 2017-B and MathWorks® releases R2016a and newer.

For information on which dSPACE Releases support which MathWorks Releases, see:
<http://www.dspace.com/goto?Versions>

Compatibility of MathWorks blocksets and toolboxes with Configuration Desk/RTI

In addition to MATLAB® and Simulink®, MathWorks® offers a wide range of blocksets and toolboxes that are extensions to the basic MATLAB and Simulink software packages.

Blocksets and toolboxes provide additional Simulink blocks. To be used with Model Implementation Package for Simulink (MIPS), ConfigurationDesk or RTI, these blocks must support code generation with Simulink Coder™.



Only known compatibility issues specific to MIPS/ConfigurationDesk/RTI are listed in this document. For detailed information on which blocks do or do not support code generation with Simulink Coder, refer to the MATLAB help¹ or contact MathWorks.

We test the compatibility of blocksets and toolboxes that provide Simulink blocks with selected demo models taken from the MathWorks installation or with our own test models designed especially for this purpose. These tests do not cover the complete functionality range of the blocksets. The complexity resulting from the number of blocks and their possible parameterizations is far too large to guarantee tests with 100% coverage.



As a result, problems might occur even when we state that a certain blockset or toolbox is supported by MIPS/ConfigurationDesk/RTI. For information on the known problems, see the blockset-specific or toolbox-specific chapters below or contact support@dspace.de.

¹ A list of blocksets that support code generation can be found under Supported Products and Block Usage in the Simulink Coder help.

Blocksets and toolboxes not listed in this document

Blocksets and toolboxes that provide Simulink blocks but are not listed in this document have not been tested with MIPS/ConfigurationDesk/RTI. Therefore, we cannot make any compatibility statements concerning these blocksets and toolboxes.

Compatibility of blocksets and toolboxes not from MathWorks

We cannot make any statement on the compatibility of blocksets and toolboxes that were not developed by MathWorks.

Overview

Legend

Supported The toolbox or blockset is supported (general limitations for use with Simulink Coder).

Not supported The toolbox or blockset is not supported.

Supported, but known issues The toolbox or blockset is supported, but there are restrictions or known problems specific to MIPS, ConfigurationDesk or RTI. Click the blockset or toolbox hyperlink to get more information.

Product Name (according to R2017b)	Description
Aerospace Blockset™	Supported
Communications System Toolbox™	Supported
Control System Toolbox™	Supported
DSP System Toolbox™	Supported, but known issues. See <i>DSP System Toolbox</i>
Fixed-Point Designer™	Supported
Fuzzy Logic Toolbox™	Supported
Neural Network Toolbox™	Supported
Parallel Computing Toolbox™	Supported, but known issues. See <i>Parallel Computing Toolbox/MATLAB Distributed Computing Server</i>
MATLAB Distributed Computing Server™	Not supported. See <i>Parallel Computing Toolbox/MATLAB Distributed Computing Server</i>
Simscape™, Simscape Electronics™, Simscape Driveline™, Simscape Fluids™ and Simscape Multibody™	Supported, but known issues. See <i>Simscape, Simscape Electronics, Simscape Driveline, Simscape Fluids, and Simscape Multibody</i>
Simscape Power Systems™	Supported, but known issues. See <i>Simscape Power Systems</i>
Simulink Control Design™	Supported
Stateflow®	Supported, but known issues. See <i>Stateflow</i>
System Identification Toolbox™	Not supported
Model Predictive Control Toolbox™	Supported, but known issues. See <i>Model Predictive Control Toolbox</i>

Supported Blocksets with Known Issues

Parallel Computing Toolbox/MATLAB Distributed Computing Server

Parallel building using MATLAB Distributed Computing Server of model reference hierarchies

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

Simulink Coder can accelerate code generation for models containing large model reference hierarchies by building referenced models in parallel whenever possible. This parallel build feature is supported by MIPS, ConfigurationDesk, RTI, and RTI-MP.

The parallel building of model reference hierarchies using MATLAB Distributed Computing Server is not supported.

For details on the parallel build feature, refer to the RTI Implementation Guide and the Simulink Coder User's Guide from MathWorks.

Parallel building using MATLAB Computing toolbox

Relevance

- MathWorks Releases: R2017b
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

In MATLAB R2017b parallel build of model referencing hierarchies might fail. Building referenced models in parallel requires a patch provided by MathWorks. For details, refer to the following bug report:

<https://www.mathworks.com/support/bugreports/1641726>

DSP System Toolbox

General limitations

UDP Send and UDP Receive blocks

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

The UDP Send and UDP Receive blocks are not supported by MIPS/ConfigurationDesk/RTI. These blocks need access to Microsoft® Windows®-dependent compiler library files, which are not available for dSPACE systems.

Trying to build a model containing UDP Send and UDP Receive blocks with a dSPACE target file results in a compiler error.

Variable description file issues**Block parameter access via variable description file****Relevance**

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

Depending on the MathWorks Release being used, it is possible that some block parameters are not accessible from the variable description file.

Simscape, Simscape Electronics, Simscape Driveline, Simscape Fluids, and Simscape Multibody

General limitations**Simscape, Simscape Electronics, Simscape Driveline, Simscape Fluids, and Simscape Multibody****RTI-MP limitation****Relevance**

- MathWorks Releases: All supported
- dSPACE platforms: RTI1005, RTI1006, RTI1007, and RTI1202
- RTI-MP

Description

For RTI-MP in particular, for a model including all the master and slave blocks and connections, the following limitation applies before model separation:

Blocks of the Simscape product family must not be inserted at the root level of a model. Otherwise, one of the following problems occurs:

- The RTI-MP Multiprocessor Setup dialog cannot be opened.

- Connection lines are not copied during model separation.
- Model separation is aborted with an error message.

These problems do not occur if the blocks are contained in subsystems.

Variable description file issues

Physical ports not available in the variable description file

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

Most blocks of the Simscape product family are not connected by regular Simulink signals but by physical connection lines. These signals are not available in the variable description file.

Run-time parameters

Online change of parameter values in Simscape blocks

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

Many Simscape blocks can contain run-time parameters in the generated code. These parameters can be accessed and modified via the variable description file.

If a Simscape parameter is designated as run-time, you can modify its value between simulation runs without the need to recompile the model. Therefore, if the simulation is stopped and the value of the parameter is changed, a new simulation can be started afterwards and the new value will be used. However, changing the value of the parameter during execution has no effect on the running simulation.

Compiler issues

PowerPC compiler warnings

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: RTI1005, RTI1103, RTI1104, and RTI1401
- RTI and RTI-MP

Description

Applications with Simscape blocks can be built for dSPACE platforms based on a PowerPC processor. Even though the Microtec PowerPC compiler issues some warnings, the application can be loaded to the real-time hardware.

Real-time execution
Performance constraints
Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

Some models including Simscape blocks might cause task overruns when loaded to the real-time hardware, due to the size of the generated application.

Reducing the size of the model and adjusting the Solver and Task Configuration can minimize the risk of triggering task overruns.

Simscape Local Solver for Simscape, Simscape Electronics, Simscape Driveline, and Simscape Fluids
Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

When simulating a Simscape model (except for Simscape Multibody), it is recommended to enable the Simscape local solver, from the Solver Configuration block, and to enable the fixed-cost option.

Increased stack size required for simulating Simscape models
Relevance

- MathWorks Releases: All supported
- dSPACE platforms: ConfigurationDesk
- ConfigurationDesk

Description

Depending on the model, the code generated by the Simscape product family requires a stack size that exceeds the default limits for ConfigurationDesk tasks.

It is therefore recommended to increase the stack size in ConfigurationDesk if the model contains Simscape blocks.

Simscape Power Systems

General limitations**RTI-MP limitation****Relevance**

- MathWorks Releases: All supported
- dSPACE platforms: RTI1005, RTI1006, RTI1007, and RTI1202
- RTI-MP

Description

The Simscape Power Systems Blockset makes extensive use of From and Goto tags with global scope to exchange simulation data. The use of these blocks can circumvent the multiprocessor data exchange mechanism implemented by interprocessor communication (IPC) blocks of the RTI-MP Blockset. This is why all parts of a multiprocessor Simulink model using the Power System Blockset should be assigned to only one processor.

Simscape Power Systems blocks must not be inserted at the root level of an RTI-MP model

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: RTI1005, RTI1006, RTI1007, and RTI1202
- RTI-MP

Description

Simscape Power Systems blocks must not be inserted at the root level of an RTI-MP model. Otherwise, one of the following problems occurs:

- The RTI-MP Multiprocessor Setup dialog cannot be opened.
- Connection lines are not copied during model separation.
- Model separation is aborted with an error message.

These problems do not occur if the Simscape Power Systems blocks are contained in subsystems.

Supercapacitor block

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

The Supercapacitor block is not supported by MIPS/ConfigurationDesk/RTI. This block contains a trigonometric function block (asinh) which, according to the Mathworks Documentation, is not supported by all compilers.

Trying to build a model containing Supercapacitor block with a dSPACE target file results in a compiler error.

Variable description file issues

Physical ports and parameters of physical modeling blocks not available in variable description file

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

Simscape Power Systems uses Physical Modeling ports and connection lines. As a result, the output variables of most Simscape Power Systems blocks are not available in the variable description file.

Run-time issues

Parameter access

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

Due to the structure of Simscape Power Systems blocks, they cannot be treated like standard Simulink blocks with respect to instrument layouts in ControlDesk. Simscape Power Systems blocks do not contain visible functional information. The simulation data can be accessed with Measurement blocks, which receive data by using From and GoTo blocks. The data is sent by a Powergui block.

Stateflow

General limitations

Using RTLib functions with Stateflow

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- RTI and RTI-MP

Description

Calling RTLib functions (e.g., I/O access) in states and transitions of a Stateflow chart is not recommended. If I/O access is required from within a state chart, it is recommended to handle this via S-functions that are placed in function-call subsystems, and triggering these subsystems by event outputs of the state charts.

Variable description file issues

Accessible states via variable description file

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- RTI-MP

Description

Block groups for Stateflow charts contain the outputs to Simulink/Stateflow test points and parameters. The states of Stateflow charts are not accessible via the variable description file. If you need to trace the state activity for a state chart, you can use the Output State Activity option for the states you need to observe. Global data of all Stateflow charts is available in the State Machine Data group.

Message objects in the variable description file

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

In addition to the standard Simulink data types Stateflow charts can exchange data using Message objects.

These messages are described in the variable description file as signals of data type Double. Even though the variable description file entry is accessible, e.g., via ControlDesk, the value returned by the corresponding variable might not be coherent.

Model Predictive Control Toolbox

General limitations

Variable access via variable description file

Relevance

- MathWorks Releases: All supported
- dSPACE platforms: All
- MIPS, ConfigurationDesk, RTI, and RTI-MP

Description

It is possible to design a model predictive controller with specific Simulink blocks. Using this toolbox is supported by MIPS, ConfigurationDesk, RTI, and RTI-MP.

The variables used in the MPC Controller block are not accessible via the variable description file.